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Arizona Zone
Entomology &
Pathology

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Subject: Functional Assistance Concerning Alder Flea Beetle and Sycamore Anthracnose on the Beaver Creek and Sedona Ranger Districts, Coconino National Forest

To: Jerry Bradley

On June 10, 1997 we met with you, Janie Agyagos, and Michelle Girard (Prescott National Forest) in order view and discuss alder defoliation caused by alder flea beetle and dieback caused by sycamore anthracnose. This letter describes our findings and future plans.

Alder Flea Beetle

Heavy defoliation caused by the alder flea beetle, Altica ambiens, was observed along Beaver Creek and Red Tank Draw. Alder flea beetle is a transcontinental species occurring throughout the west. Alder species are the principal hosts. Adults are small to medium sized, compact, generally oval, dark shiny blue beetles. Larvae are brownish black in color with black head and thorax and short legs. Both adults and larvae feed on alder foliage. Life cycle is reported to take a year with adults emerging in spring from overwintering places in the duff and other sheltered locations. Egg laying commences after a period of feeding. Larvae are reported to reach maturity in August when they drop down to the duff to pupate. New adults emerge in a week to 10 days and they feed on foliage until the close of the season at which time they drop down into the duff for the winter.

Interestingly during this visit we observed new adults in June as opposed to August, which suggests the possibility of a second generation here in the Southwest. Subsequent visits however did not reveal any new larvae so it is unclear whether two generations occur here or if populations simply collapsed. There was very little foliage to oviposit on in June at some of these sites so that could have been a factor.

Little is known about the causes underlying flea beetle outbreaks or their effects. We have observed sporadic shortlived outbreaks here in the Southwest. These have only lasted a season in our experience to date. Extensive mortality has not been reported in the literature. We have observed trees that have sustained heavy defoliation to have varying levels of branch dieback, however it is unknown whether the dieback was associated with the defoliation or not. Dieback is not uncommon with hardwood defoliators following episodes of heavy defoliation. Generally though hardwoods are fairly resistant to defoliation

since they are capable of refoliating following a defoliation episode. Growth may be reduced on affected trees during the outbreak but returns to normal afterwards. Non host species may show increased growth during outbreaks due we think to reduced competition as well as the "fertilizer effect" of falling frass (insect feces). Branch or top dieback can occur with severe defoliation. Rarely mortality occurs, usually following multiple years of defoliation.

We observed varying levels of alder defoliation on streams located within Beaver Creek and Sedona Ranger Districts. The heaviest defoliation occurred on Beaver Creek in the vicinity of the Ranger Station and along Oak Creek, particularly the lower elevation areas immediately around Sedona extending up to the vicinity of Indian Gardens. Moderate levels of defoliation were observed on Red Tank Draw and on West Clear Creek.

Sycamore Anthracnose

A foliar and stem disease of Arizona sycamore, known as sycamore anthracnose, was observed to varying degrees in all of the riparian areas we surveyed. It is caused by the fungus Apiognomonia veneta. This disease is most prevalent in Wet Beaver Creek, Red Tank Draw and West Clear Creek. Sycamore anthracnose is unique in that it is able to infect several parts of its host: leaves, twigs, and young shoots. These infected areas correspond, respectively, to the following disease "phases": leaf blight, twig blight (canker formation), and shoot blight. Year-to-year weather patterns influence the severity of each phase. Where the disease was observed, all three phases could be detected.

Leaf blight results from direct infection of leaves from airborne fungal spores. During wet seasons the fungus can colonize and spread quickly through leaves, killing enough tissue to cause premature defoliation. Hyphae of the fungus can grow through petioles into the twigs where the fungus can overwinter at nodes in twigs, setting the stage for twig and shoot blight.

During the growing season of the host, defense mechanisms prohibit the expansion of the fungus into twigs. However, the fungus grows during host dormancy and begins forming cankers and killing buds and twigs. Although many twig lesions are restricted to the immediate vicinity of buds, others expand and encircle twigs, causing death of parts beyond the lesions. This type of damage intensifies over the years in a given tree as the population of the pathogen increases. Large trees that repeatedly sustain severe damage by anthracnose are weakened, as evidenced by loss of vigor, dieback of large branches, and apparent increased susceptibility to borers.

Repeated twig dieback alters the form of sycamores in two characteristic ways. First, when the terminal twig on a branch is killed, a lateral takes over as the new leader. The branch axis thus changes direction repeatedly, and crooked branches result. The second alteration is the development of a cluster of twigs around a common point on a branch because of the repeated killing of terminals.

Shoot blight involves the rapid death of expanding shoots and leaves. It occurs when the pathogen in twig cankers either kills twigs on which shoot growth has begun or enters succulent new shoots soon after they emerge from buds. Shoot

blight tends to develop suddenly during or immediately after a period of cold spring weather, and is often confused with early-spring frost injury.

A general decline in the health of sycamore trees was observed in most of the riparian areas we surveyed. Although Sycamore Anthracnose is the likely cause of the large branch mortality, tree age and change in water course are probably the primary factors of decline.

Future Plans

In order to gain a better understanding of the effects of these agents in riparian ecosystems we plan to establish monitoring plots. To date we are still in the planning stages but would like to establish plots in the fall and begin monitoring next spring. If you have specific areas you would suggest for monitoring please let us know. Our thoughts were to begin establishing plots along Beaver Creek and Red Tank Draw.

If you have any questions about this letter feel free to give either of us a call. Jill can be reached at 556-2074 and Mary Lou can be reached at 556-2075.

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